

CONSTRUCTION CONTRACTING

INSTITUTE FOR FACILITIES MANAGEMENT

FACULTY: T. MARK MILLER, P.E, MEM, M.ASCE
ASSISTANT VICE PRESIDENT
FACILITIES MANAGEMENT & PLANNING
THE PENNSYLVANIA STATE UNIVERSITY

AIA
Continuing
Education
Provider

1

AIA CREDITS

Credit(s) earned on completion of this course will be reported to American Institute of Architects (AIA) Continuing Education Session (CES) for AIA members.

Certificates of Completion for both AIA members and non-AIA members are available upon request.

This course is registered with AIA CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

AIA
Continuing
Education
Provider

2

COURSE DESCRIPTION

408 Construction Contract Administration APPAU201909M

Discuss the various project delivery approaches utilized by colleges and universities. Learn about the basic legal and contractual documents for a design and construction project. Examine the structure of a construction contract. Review bidding strategies and procedures for soliciting a construction bid and explore various techniques for structuring a bid proposal to the owner's advantage.

Faculty:

AIA
Continuing
Education
Provider

3

LEARNING OBJECTIVES

- 1. Discuss bidding strategies for construction bids
- 2. Discuss project delivery approaches
- 3. Learn basic legal and contractual design documents for design and construction.
- 4. Discuss the construction contract structure

AIA
Continuing
Education
Provider

4

OUTLINE

- 1. Contractual Relationships
- 2. Delivery Approaches
- 3. Contract Documents
- 4. Bidding & Award

5

CONTRACTUAL RELATIONSHIPS

6

AGENTS AND VENDORS



Agents:

Provide professional Services
Act in the owners interest
Qualification based selection
Serve owners loosely defined needs
Follows a professional code of conduct



Vendors:

Provide a specific product or service
Act in their own interest
Value or cost basis selection
Meet specified requirements
Contract defines standard of conduct

7

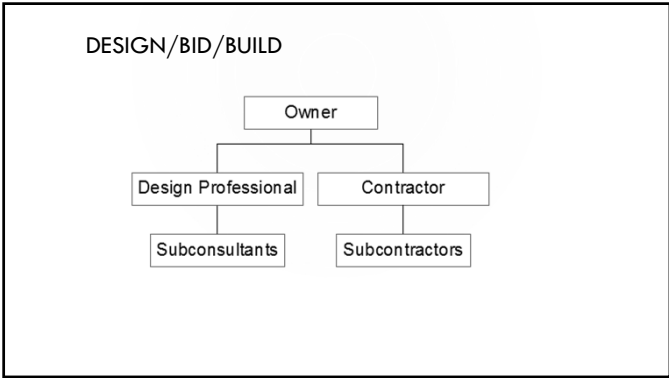
DELIVERY APPROACHES

8

DELIVERY APPROACHES

- Design-Bid-Build
- Design-Build
- Construction Management at Risk
- Construction Management with Bid of Fees and General Conditions
- Multiple Prime Contracts
- Cost-Plus
- Job Order Contracting
- Privatized Design-Build-Finance
- Integrated Project Delivery

9



10

DESIGN/BID/BUILD

Advantages

- Process most familiar to institutions
- Owner controls the design...completed under separate owner/A-E contract prior to construction
- Competitive pricing for entire construction contract

11

DESIGN/BID/BUILD

Disadvantages

- No mean to expedite schedule...drawings and specs must be 100% complete to bid
- Construction contract awarded to low bidder without consideration of qualifications
- No contractor assistance pre-construction
- Not an open book process
- Adversarial, change order environment
- Construction price not fixed until after design and bids are finalized
- Time consuming if bids exceed project budget

12

DESIGN/BUILD

```

graph TD
    Owner[Owner] --- DBC[Design/Build Contractor]
  
```

Traditional D-B

- Owner holds single contract
- Selection process is based on qualifications and price
- Constructability review during design
- Design is not complete prior to selection

13

DESIGN/BUILD

Advantages

- Single point of responsibility for both design and construction
- A/E and contractor work together through all project phases
- Guaranteed maximum price is fixed early in the design phase of the project
- Contract is awarded based on A/E and contractor team qualifications
- Project schedule can be fast tracked
- Less adversarial relationship
- Reduced change orders
- Contractor is motivated to ensure owner satisfaction when selections are based on qualifications and performance

14

DESIGN/BUILD

Disadvantages

- Works best with simple project types where requirements can be fully documented in request for proposals (RFP)
- Pre-planning is needed to prepare sufficient material for (RFQ)/RFP process
- Owner has less control of design process...A/E typically working for the contractor
- Design changes can result in costly impacts to drawings or construction work in progress
- Disagreements related to intended quality of work can occur
- May not work any better than D-B-B if mutual trust relationships are not built
- Is not legal in some states

15

DESIGN/BUILD (BRIDGING)

```

graph TD
    Owner[Owner] --- TC[Technical Consultant]
    Owner --- DBC[Design/Build Contractor]
  
```

Alternative to D-B

- Schematic design and RFP/RFQ documents prepared by A/E
- Separate bridging A/E selection required
- Helps ensure adequate RFP documents are prepared

16

CONSTRUCTION MANAGER AT RISK

```

graph TD
    Owner[Owner] --- DP[Design Professional]
    Owner --- CMF[CM Firm]
    CMF --- SC1[Subcontractor]
    CMF --- SC2[Subcontractor]
  
```

CM@R Structure

- Owner holds separate contracts
- Separate qualifications based selection required
- Constructability review during design

17

CONSTRUCTION MANAGER AT RISK

Advantages

- A/E, owner, and (CM@R) work together through all phases
- GMP may be fixed early, during the design phase of the project
- Project can be expedited with fast-track construction, which can also reduce costs
- Construction contract is awarded on basis of CM@R qualifications and past performance
- Construction work is competitively priced through low bids of prequalified subcontractors
- Less adversarial relationship is encouraged between owner and A/E-contractor
- Change orders are generally reduced due to A/E and contractor coordination through the design phase
- Owner controls the design, which is completed under direct owner-A/E contract
- Provides more design-change flexibility for complex building types

18

CONSTRUCTION MANAGER AT RISK

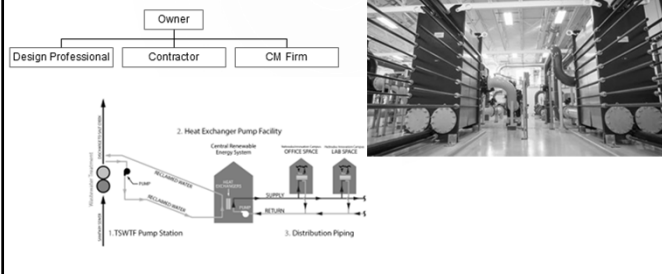


Disadvantages

- Fast-track construction presents risks related to incomplete construction documents
- Design changes during construction can result in costly changes to construction work already in progress
- CM@Rs must learn to provide quality preconstruction services
- Is not legal in some states

19

CONSTRUCTION MANAGER FOR-FEE



20

CONSTRUCTION MANAGER FOR-FEE

Advantages

- A/E, owner, and contractor (CM) can work together through all phases of the project
- GMP may be fixed early, during the design phase of the project
- Project can be expedited with fast-track construction, which can also reduce costs
- Change orders can be reduced with improved A/E and CM coordination through the design phase
- Owner can control the design, which is completed under direct owner-A/E contract
- Provides more design-change flexibility for complex building types
- Ensures lowest CM fee and/or general conditions amounts through bid process

21

CONSTRUCTION MANAGER FOR-FEE

Disadvantages

- CM qualifications or past performance are considered in the CM selection process
- The lowest bid of fees and/or general conditions is not an indicator of CM capabilities
- Fee and/or general conditions savings can be much less than the cost of CM inefficiencies
- Fast-track construction presents risks related to incomplete construction documents
- CMs must learn to provide quality preconstruction services
- May not work better than DBB if mutual trust relationships are not built
- Is not legal in some states

22



AGENCY CONSTRUCTION MANAGEMENT W/D-B-B

- Agency construction manager is hired as a consultant to help represent the owner
- Can be an advantage if you are looking at specialized construction and your in-house construction management staff has limited experience with this type of construction

23

AGENCY CONSTRUCTION MANAGEMENT W/D-B-B

Advantages

- Same advantages as noted for DBB process
- Agency CM can provide industry experience and estimating, scheduling, and project management expertise for the owner's benefit

24

AGENCY CONSTRUCTION MANAGEMENT W/D-B-B

Disadvantages

- Same disadvantages as noted for D-B-B process
- Agency CM has no direct accountability for the success of the construction process
- Owner must pay the fees of an agency CM in addition to the contractor's fees for the construction work
- Agency CM must be committed to representing the owner first and foremost, or a loss of control can result

25

MULTIPLE PRIME CONTRACTS

- Multiple direct owner-contractor prime contracts
- Bid for various trades as needed to complete project
- Done as state procurement requirement
- Often with a fee base CM contract

26

MULTIPLE PRIME CONTRACTS

Advantages

- Construction method required by the procurement law in certain states
- Can reduce markups of general contractors who otherwise would oversee the entire scope of work
- Can be preferred by some established subcontractors who have prime contracts with the owner
- Project can be expedited with fast-track construction, which can also reduce costs

27

MULTIPLE PRIME CONTRACTS

Disadvantages

- No single point of responsibility for the various trades
- Construction is awarded to multiple low bidders, without consideration of their qualifications
- The owner is responsible for conflicts and inefficiencies between the multiple prime contractors
- No contractor assistance with estimating, plan checking, and constructability reviews during design
- Not an open-book process—bid shopping can occur and actual overhead and profit amounts are unknown
- Adversarial, change-order-oriented environment can occur between owner, A/E, and contractor
- Construction price is not fixed until after the design and all bid processes are completed
- Time-consuming redesign and rebid is generally required if bids come in over budget

28

NEGOTIATED CONTRACTS

- Vast majority of the time occurs at private institution settings
- Can be used for construction or design services
- A/E or contractor is informally selected
- Contract is developed through negotiation

29

NEGOTIATED CONTRACTS

Advantages

- Informal contractor selection and award process can be expedited
- Informally negotiated contract can be informally terminated if needed
- Terms and conditions of private sector contracts are often more oriented toward the owner's interests

30

NEGOTIATED CONTRACTS

Disadvantages

- Negotiated contracts are generally not legal for use by public owners
- Informal contractor selection processes may not identify the most qualified contractors
- This process can lead to perceptions of favoritism toward often-utilized contractors

31

COST-PLUS AND UNIT PRICE CONTRACTS

Does not establish total construction contract amount in advance

Uses the actual documented construction costs or pre-established unit prices plus agreed-upon contractor fee markups

Good contracting mechanism for emergency or re-occurring annual work

32

COST-PLUS AND UNIT PRICE CONTRACTS

Advantages

- Does not rely as much on accurate estimating or bidding of the work
- Reduces potential for change-order-related conflicts
- Open-book process allows the owner to keep track of actual costs and appropriate compensation
- Good process if budget is not limited or phased completion levels are flexible

33

COST-PLUS AND UNIT PRICE CONTRACTS

Disadvantages

- Is not conducive to effective overall project budget management
- Is not legal in some states

34

- Similar to unit price however usually involves a GC for extend scope of work
- Contract is based on a specification and a unit price book
- Bids are based on a multiplier; contract is awarded to the lowest multiplier
- Project cost is determined by:
(quantities) x (book unit prices) x (multiplier)
- Used extensively in the federal government

JOB ORDER CONTRACTING

35

JOB ORDER CONTRACTING

Advantages

- Expedites projects by eliminating project-specific bid phases and reducing design documentation requirements
- Allows for construction price negotiation based on an established construction cost unit-price book
- Less adversarial relationship is encouraged between owner and contractor
- Can be utilized with single or multiple job order contracting (JOC) contractors

36

JOB ORDER CONTRACTING

Disadvantages

- Works best on small- to medium-sized projects with easily identified construction components
- Allowable JOC project size is limited by the procurement codes of most jurisdictions
- Although process is more informal, files and documentation must be carefully kept for audits
- Is not legal in some states

37



PRIVATIZED DESIGN-BUILD FINANCE (P3)

- Turnkey design, construction, financing and possible operation of a facility by private developer
- Commonly being used for residential housing and parking structures
- Varying levels of legal, financial, and ownership participation by the university owner

38

PRIVATIZED DESIGN-BUILD FINANCE (P3)

Advantages

- Some advantages as DB except
- Owner generally pays for facility through lease payments over time, rather than through bond sales or other financing methods.
- Some design and quality control can be incorporated into the terms of the ground lease, when applicable.
- The owner may receive ownership of the building at the end of the ground lease term.
- The project cost may not be included on the owner's financial statements in some cases.

39

PRIVATIZED DESIGN-BUILD FINANCE (P3)

Disadvantages

- Same disadvantages as DB except
- Less control of design, quality, and maintainability with developer managing the design and construction process
- Developer may be able to build projects less expensively, but at lower quality levels
- Developer may not have access to tax-free financing and reasonably expects to make a profit on the project
- Projects are often included on owner balance sheets by bond/credit rating agencies anyway

40

CONTRACT DOCUMENTS

41

CONTRACT DOCUMENTS

Contracts are a compilation of documents that usually include:

- The Agreement
- General Conditions
- Special Conditions
- Scope of Work
- Drawings
- Specifications
- Bill of Quantities
- Construction Schedule
- Schedule of Values



42

CONSTRUCTION AGREEMENT

- Most fundamental in a contract
- Basically "the contract"...foundation that the rest of the project details are built upon
- Document will set the general purpose, contract price and total construction time
- Agreements can be standard AIA documents or usually customized state/institutional documents

43

FORM OF AGREEMENT BETWEEN CONTRACTOR AND OWNER

This AGREEMENT made the Day day of MONTH in the year Two Thousand Thirteen BY AND BETWEEN CONTRACTOR, hereinafter called the Contractor, and the Board of Regents, State of Iowa, hereinafter called the Owner, on behalf of The University of Iowa, WITNESSETH, that the Contractor and the Owner for the considerations hereinafter named agree as follows:

Article 1. Scope of the Work - The Contractor shall furnish all of the materials and perform all of the Work shown on the Drawings and/or described in the Specifications entitled:

PROJECT TITLE
PROJECT #

prepared by A/E, ESM, acting as and, in these Contract Documents entitled, the Design Professional. The Contractor shall do everything required by this Agreement, and the Contract Documents for the completion of the Contract.

Article 2. Commencement and Completion of Work - The work to be performed under this Agreement shall be completed in CALENDAR DAYS calendar days from the commencement of the Contract Time. It is agreed that the Contract Time is of prime importance and of the essence of this Agreement and that failure to complete the Work on schedule will cause the Owner to sustain substantial damages. The Contract Time will, however, be extended in the event of occurrence of any conditions described in Paragraph 8.3 of the General Conditions of the Contract.

(OR)

Article 2. Commencement and Completion of Work - The work to be performed under this Agreement shall be completed by CALENDAR DATE. It is agreed that the Contract Time is of prime importance and of the essence of this Agreement and that failure to complete the Work on schedule will cause the Owner to sustain substantial damages. The Contract Time will, however, be extended in the event of occurrence of any conditions described in Paragraph 8.3 of the General Conditions of the Contract.

Article 3. The Contract Sum - The Owner shall pay the Contractor for the performance of the Contract, subject to additions and deductions provided herein, in current funds the NET CONTRACT SUM indicated below:

BASE PROPOSAL Alternate No. 1	BASE PROPOSAL ALTERDATE
NET CONTRACT SUM	NET SUM

44

GENERAL CONDITIONS

- Are general in nature and do not address the specifics of the project
- Govern the conduct of the parties
- Define duties and responsibilities
- Outline procedures
- Standard Forms
 - (AIA A201/Consensus Doc 210)

45

SCOPE OF WORK

- Also known as statement of work
- Can be included in the construction agreement section or separate section of the contract
- Describes in detail the project and tasks of the contractor
- Scope of work determines the amount of work the contractor needs to complete to fulfill contractual obligations
- GC's and subs need to know what is in and what is out of their scope

49

BIDDING REQUIREMENTS

- Advertisement or Invitation to Bid
- Instructions to Bidders
- Bid Form
- Bid Bond

50

DRAWINGS

- Graphic depiction of project requirements
- Show dimensions and arrangement
- Provide the basis for quantities
- Are interrelated and cross referenced

51


SPECIFICATIONS

- Define physical character and quality of materials, products and equipment
- Contains all the technical data and performance requirements
- Establish standards for workmanship
- Formatted into divisions as outlined by CSI

52

SPECIFICATIONS

Most institutions will have their own guide specs!



DESIGN AND CONSTRUCTION STANDARDS


Introduction

The Manual of Design and Construction Standards has been prepared by the University to guide architects and engineers, hereafter referred to as the Professional, concerned with design, building and other facilities for The Pennsylvania State University. The information contained herein applies to the University Park Campus and all other Campuses. The Manual's Working Model Center (WMC) and all other facilities.

It serves as a fully functioning technical reference, the Manual's Working Model Center contains a single section which the University system, and handles the many requirements and regulations that do not apply to other University facilities. All construction being performed at the Manual's Working Model Center must meet the design standards and requirements listed in this Manual. In addition, the Section 01-10 describes specific requirements that apply only to projects at WMC, including the following:

Requirement	Version Date	Description
Architectural	March 2019	Architectural design standards for projects at WMC.
MEP	March 2019	Mechanical, electrical and plumbing design standards for projects at WMC.
Fire Protection	March 2019	Fire Protection & Construction (FP&C) changes for WMC and F&C Design and Construction Standards.
Construction	July 2019	Construction control requirements for all construction, including control of materials and workmanship activities at WMC.

53



BILL OF QUANTITIES

- Isn't optional on some contracts but can be helpful
- Itemized list of various materials, parts and labor
- Purpose is to all bidders to estimate costs more accurately
- Looks similar to a schedule of values...some times used interchangeably

54



CONSTRUCTION SCHEDULE

- Common types of schedules include Gantt charts or Critical Path Method
- Schedules can be simple outlines of the project
- The more complex and larger the project the more formal and detailed the schedule needs to be
- Schedules keep everyone aware and informed as to project status

55



SCHEDULE OF VALUES

- Allocates the entire contract sum among the various portions of work
- Useful management tool to form the basis for submitting and reviewing progress payments
- Keeps the cash flowing and bills paid for the contract

56

MODIFICATIONS

- Addenda are changes prior to bidding
- Change Orders are changes after award



57

BIDDING & AWARD

58

BID SOLICITATION

Public or private institution?
Competitive bid or negotiation?



59

CONTRACTOR QUALIFICATIONS
Pre-qualification vs. Post-qualification

Factors to consider

- Experience
- Personnel
- References
- Finances
- Work in progress

60



ALTERNATES

- Contractor priced scope options
- May be additive or deductive
- Protect the budget
- Complicate the bid process
- Selection considerations

61

BID TABULATION

Bidder's Name	Base Bid	Alt. No. 1	Alt. No. 2	Alt. No. 3	Alt. No. 4
Kidwell Construction	6,422,400.00	70,500.00	74,500.00	71,500.00	94,700.00
Curtis Manes Schultz	3,498,000.00	79,069.00	54,059.00	49,550.00	89,589.00
Montenson	3,759,000.00	77,500.00	50,500.00	49,200.00	126,800.00
Sircal Contracting	6,438,000.00	69,800.00	59,700.00	57,900.00	67,800.00
Walton Construction	3,754,000.00	75,000.00	57,000.00	57,500.00	88,000.00
Lico Construction	3,591,000.00	71,500.00	69,180.00	66,780.00	87,370.00

Base Bid \$5,697,768
 Alt. No. 1 44,112.00 - Add Mezzanine
 Alt. No. 2 89,219.00 - Complete construction of 2nd floor West
 Alt. No. 3 89,219.00 - Complete construction of 2nd floor East
 Alt. No. 4 133,688.00 - Upgrade finishes

62

PROJECT NO: 990073
LOCATION: Forward Hall
DESCRIPTION: Renovation and Addition

DATE: December 17, 1998
TIME: 2:00 P.M.

Bidder's Name	Base Bid	Alt. No. 1	Alt. No. 2	Alt. No. 3	Alt. No. 4
Kidwell Construction	6,422,400.00	70,500.00	74,500.00	71,500.00	94,700.00
Curtis Manes Schultz	3,498,000.00	79,069.00	54,059.00	49,550.00	89,589.00
Montenson	3,759,000.00	77,500.00	50,500.00	49,200.00	126,800.00
Sircal Contracting	6,438,000.00	69,800.00	59,700.00	57,900.00	67,800.00
Walton Construction	3,754,000.00	75,000.00	57,000.00	57,500.00	88,000.00
Lico Construction	3,591,000.00	71,500.00	69,180.00	66,780.00	87,370.00

Base Bid \$5,697,768
 Alt. No. 1 44,112.00 - Add Mezzanine
 Alt. No. 2 89,219.00 - Complete construction of 2nd floor West
 Alt. No. 3 89,219.00 - Complete construction of 2nd floor East
 Alt. No. 4 133,688.00 - Upgrade finishes

BB and Alt. #1 & 2
 Kidwell \$5,565,400
 Sircal \$5,565,500

BB and Alt. #1, 2 & 3
 Kidwell \$5,638,900
 Sircal \$5,639,400

BB and Alt. #1 & 3
 Kidwell \$5,566,400
 Sircal \$5,565,700

BB and Alt. #3
 Kidwell \$5,495,900
 Sircal \$5,495,900

63

**BIDDING
PROCESS**

- Advertising and solicitation of interest
- Printing of bid document sets
- Pre-bid meeting
- Addenda
- Bid Closing
- Bid Opening

67

BID BOND

Surety-backed guarantee

Protects against mistakes in bidding

Covers differences in price between bids

68

BID MISTAKES

**Judgmental
Error**

**Clerical
Error**

69

AWARD OF CONTRACT

73

AWARD OF CONTRACT

Evaluation of bidder responsibility

Bid acceptance period

74

ARTICLE 5 - MODIFICATION OF BIDS

5.1 The Form of Bid shall not be modified in any way, and the bid shall not be qualified or conditioned in any way. Modifications, qualifications or conditions placed on the Form of Bid or submitted with the bid may result in the rejection of the bid.

ARTICLE 6 - WITHDRAWAL OF BIDS

6.1 Any bid may be withdrawn prior to the time set for the receipt of bids. No bid may be withdrawn for a period of forty-five (45) calendar days thereafter.

ARTICLE 7 - BID SECURITY FOR NON-TARGETED SMALL BUSINESS BIDDERS

7.1 Bids shall be accompanied by and secured only by a cash deposit, a cashier's check, a certified check, or a bid bond in an amount of at least five percent of the bid. Bids accompanied and secured by any other form of bid security shall automatically be disqualified.

75

AWARD OF CONTRACT

- Evaluation of bidder responsibility
- Bid acceptance period
- Execution of contract

76

REVIEW AND RECAP

Contractor - A gambler who never gets to shuffle, cut, or deal.
Bid - A wild guess carried out to two decimal places.
Bid Opening - A poker game in which the losing hand wins.
Low Bidder - A contractor who is wondering what he left out.
Project Estimate - The cost of construction in Heaven.
Project Manager - The conductor of an orchestra in which every musician is in a different union.
Critical Path Method - A management technique for losing your shirt under perfect control.
Liquidated Damages - A penalty for failing to achieve the impossible.
Sureties - People who go in after a battle is lost and bayonet the wounded.
Lawyers - People who go in after the sureties and strip the bodies.

77

This concludes The American Institute of Architects Continuing Education Systems Course



78